

CALIBRATION STANDARD REQUIREMENT

FOR A

DECADE CAPACITOR

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PROCUREMENT PACKAGE

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CALIBRATION STANDARD REQUIREMENT FOR A
DECADE CAPACITOR

1. SCOPE

1.1 Scope. This requirement defines the mechanical and electrical performance requirements for a Decade Capacitor. The equipment is intended for use by shipboard and shorebased Navy personnel to calibrate capacitance measuring instruments.

2. APPLICABLE DOCUMENTS

2.1 Controlling Specifications. MIL-T-28800, "Military requirement, Test Equipment for use with Electrical and Electronic Equipment, General specification for," and all documents referenced therein of the issues in effect on the date of this solicitation shall form a part of this requirement.

3. REQUIREMENTS

3.1 General. The Decade Capacitor shall conform to the Type II, Class 5, Style E requirements as specified in MIL-T-28800 for Navy shipboard and shorebased use as modified below.

3.1.1 Design and Construction. The Decade Capacitor design and construction shall meet the requirements of MIL-T-28800 for Type II equipment.

3.1.2 Power Requirements. Not applicable.

3.1.3 Dimensions and Weight. The maximum dimensions shall not exceed 19 inches (48 cm) in width, 6 inches (15 cm) in height and 12 inches (30 cm) in depth. The weight shall not exceed 30 pounds (14 kg).

3.2 Environmental Requirements. The Decade Capacitor shall meet the environmental requirements for a Type II, Class 5, Style E equipment with the deviations specified below.

3.2.1 Temperature and Humidity. The Decade Capacitor shall meet the conditions below:

	<u>Temperature(°C)</u>	<u>Relative Humidity(%)</u>
Operating	10 to 30	80
	30 to 40	70
Non-operating	-40 to 70	Not controlled

3.2.2 Electromagnetic Compatibility. Shall not be a requirement.

3.3 Reliability. Type II reliability requirements are as specified in MIL-T-28800.

3.3.1 Calibration Interval. The Decade Capacitor shall have an 85% or greater probability of remaining within tolerances of all requirements at the end of a 12 month period.

3.4 Maintainability. The Decade Capacitor shall meet the Type II maintainability requirements as specified in MIL-T-28800 except the lowest discrete component shall be defined as a replaceable assembly. Certification time shall not exceed 60 minutes.

3.5 Performance Requirements. The Decade Capacitor shall provide the following capabilities. Unless otherwise indicated, all requirements shall be met following a 30 minute warm-up period.

3.5.1 Range. The Decade Capacitor shall have a range of 0 to at least 1.11111 μF in increments of 1 pF or less.

3.5.2 Accuracy. The Decade Capacitor shall have an accuracy of $((0.05\% + 0.5 \text{ pF})$ at 1 kHz and at the temperature of 23(C. To this basic uncertainty should be added that which is determined by the temperature coefficient of paragraph 3.5.5 for capacitor temperatures different from 23(C.

3.5.2.1 Correction Curves. Correction curves shall be included with the Decade Capacitor shall be included in the Operation and Maintenance Manual for capacitance changes at other frequencies.

3.5.3 Resolution. The Decade Capacitor shall have a resolution of at least six digits.

3.5.4 Stability. The Decade Capacitor shall have a stability of $((0.01\% + 0.1 \text{ pF})$ per year.

3.5.5 Temperature Coefficient. Over the range +10(C to +40(C, the temperature coefficient for the Decade Capacitor should not exceed (20 ppm per degree difference between the capacitor's temperature and the preferred temperature of 23(C.

3.5.6 Residual Capacitance. The Decade Capacitor shall have a residual capacitance of 0.1 pF or less.

3.5.7 Voltage Rating. The Decade Capacitor shall have a voltage rating of 500 V_{peak} at all frequencies up to 10 kHz. Performance shall not be degraded at or below this voltage.

3.5.8 Dissipation Factor. The Decade Capacitor shall have the following maximum dissipation factors at 1 kHz.

<u>CAPACITANCE</u>	<u>DISSIPATION FACTOR (MAX)</u>
1 pF to 100 pF	0.002

101 pF to 1000 pF	0.001
1001 pF to 2000 pF	0.0005
2001 pF to 0.1 μ F	0.0003
0.1 μ F to 1.11111 μ F	0.0004

Correction curves shall be included with the Decade Capacitor or shall be included in the Operation and Maintenance Manual for Dissipation Factors at other frequencies.

3.5.9 Insulation Resistance. The Decade Capacitor shall have the following performance capabilities with respect to insulation resistance after 2 minutes at 500 Vdc

<u>CAPACITANCE</u>	<u>INSULATION RESISTANCE</u>
1 pF to 0.1 μ F	5 (10^{10} ohm
0.1 μ F to 1.11111 μ F	5 (10^9 ohm

3.5.10 Capacitance Terminal Configuration. The Decade Capacitor shall be configured with two floating shield connectors. When the two shields are connected together, the Decade Capacitor shall take the form of a three-terminal capacitor.

3.5.11 Frequency Range. The Decade Capacitor shall have a frequency range of 10 Hz or less to at least 1 MHz.

3.6 Operating Requirements. The oscillator shall provide the following capabilities.

3.6.1 Front Panel Control Requirements. All modes and functions shall be operable using front panel controls. The location and labeling of indicators, controls and switches shall provide for maximum clarity and easily understood operation without reference to tables, charts or flow diagrams.

3.7 Manual. At least two copies of an operation and maintenance manual shall be provided. The manual shall meet the requirements of MIL-M-7298.

3.7.1 Calibration Procedure. A calibration procedure in accordance with MIL-M-38793 shall be provided.